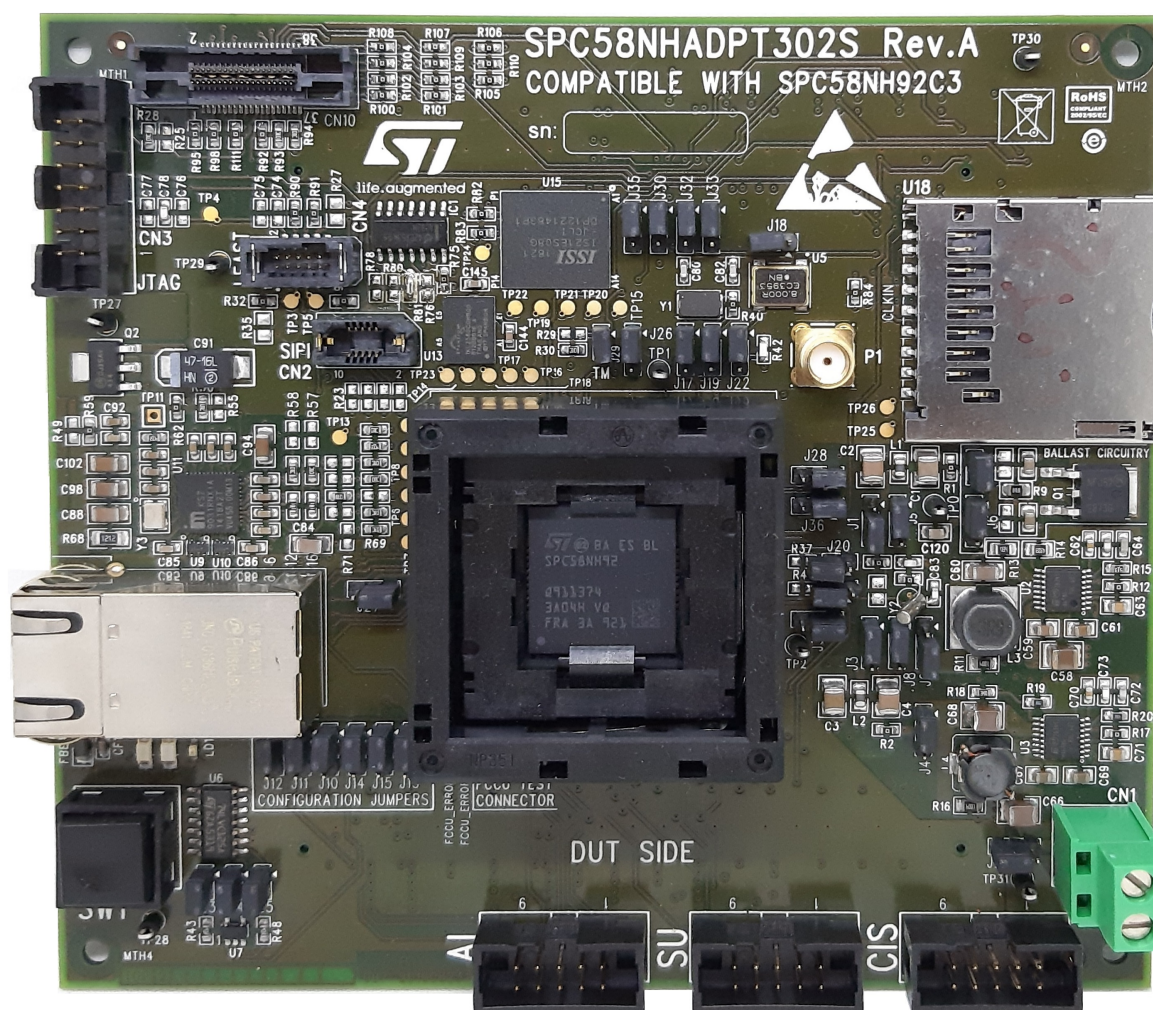


## SPC58NHADPT302S Rev.A evaluation board

### Introduction

The SPC58NHADPT302S Rev.A evaluation board supports STMicroelectronics SPC58NH92 microcontroller in FPBGA 17X17X1.8 302.

Figure 1. SPC58NHADPT302S Rev.A



Note: picture is not contractual.

## 1 Overview

The SPC58NHADPT302S Rev. A mini module is an evaluation board supporting STMicroelectronics SPC58NH92 microcontroller in FPBGA 17X17X1.8 302 package (FPBGA 17X17X1.8 302 2R20+10+2R14+52 B0.55 P0.8).

This mini module is designed to be connected onto the SPC58XXMB motherboard, offering a mechanism for easy customer evaluation of the supported devices, and to facilitate hardware and software development.

The mini module may be used as a stand-alone unit allowing access to the CPU, but not to access to the I/O pins nor any motherboard peripherals.

### 1.1 Package contents

An SPC58NHADPT302S Rev. A adapter package includes the following items:

- SPC58NHADPT302S Rev. A mini module
- Mini CD with user manual and schematics

### 1.2 Supported devices

The SPC58NHADPT302S Rev. A mini module supports the SPC58NH family of microcontrollers in FPBGA 17X17X1.8 302.

## 2 License agreement

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The packaging of this evaluation board was sealed with a seal stating, “by breaking this seal, you agree to the terms and conditions of the evaluation board license agreement, the terms and conditions of which are available at <http://www.st.com/eb1a>”. Upon breaking the seal, you and STMicroelectronics entered into the evaluation board license agreement, a copy of which is also enclosed with the evaluation board for convenience.

**Attention:** *This evaluation board only offers limited features for evaluating ST products. It has not been tested for use with other products and is not suitable for any safety or other commercial or consumer application. This evaluation board is otherwise provided “AS IS” and STMicroelectronics disclaims all warranties, express or implied, including the implied warranties of merchantability and fitness for a particular purpose.*

### **3 Handling precautions**

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Please take care to handle the package contents in a manner such as to prevent electrostatic discharge.  
Before the EVB is used or power is applied, please fully read the following sections on how to correctly configure the board. Failure to correctly configure the board may cause irreparable component, MCU or EVB damage.

## 4 Hardware description

### 4.1 Hardware features

The SPC58NHADPT302S Rev. A mini module board has the following features:

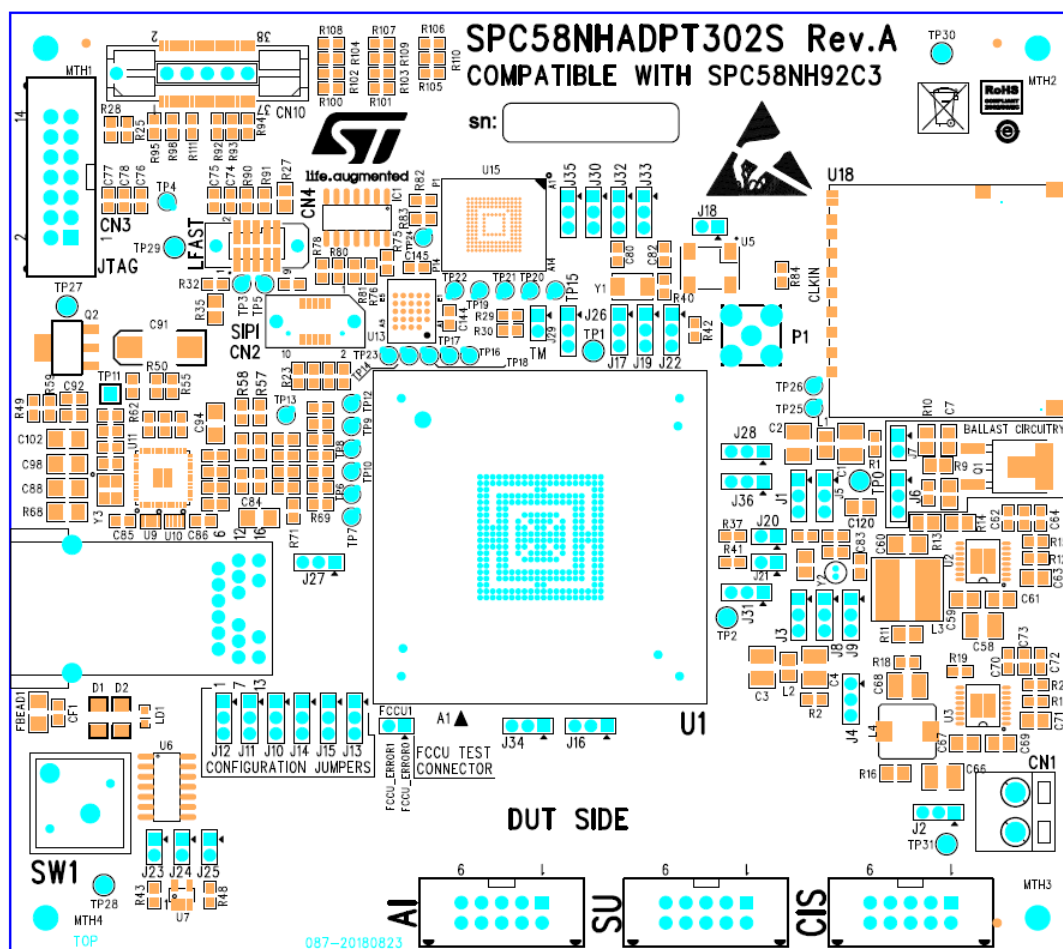
- Connector for external power supplies input (5 V) used in stand-alone mode
- Reset button with driver and led indicator
- Socket for device in FPBGA302 package
- Debug interfaces:
  - 14-pin header connector for JTAG interface
  - 10-pin header connector for JTAG/LFAST LVDS interface
  - 10-pin header connector for SIPI interface
  - 38-pin Nexus parallel debug connector
- 40 MHz crystal main oscillator with jumpers to optionally disconnect it
- 8 MHz oscillator with jumpers to optionally disconnect it
- Clock input through SMA connector with jumper to optionally disconnect it
- 2 X Samtec QSH series, 240-way connector to connect mini module to Motherboard
- 1 Gb/s Ethernet port
- HyperRAM and HyperFlash connected to HyperBUS interface
- Embedded eMMC device
- SD/MMC Card Reader
- 3x Header connectors 5x2 with 0.1" (CIS, ISU and AI connectors)

## 4.2 Hardware dimension

The mini module has the following dimensions:

- PCB area: 127 mm x 114.3 mm
- Top components height: 20 mm max
- Bottom components height: 3.5 mm max
- PCB thickness: 1.6 mm

**Figure 2. SPC58NHADPT302S Rev. A top component view**



## 5 Power and system configuration

### 5.1 Power supplies

The mini module can be powered by providing voltages or supplied externally by the 2-Way PCB Screw Connector (CN1) or supplied by the motherboard.

When the mini module is connected to the mother board (MB), 3V3 and 5V0 are supplied by MB connector selecting the associated jumpers. In this setup, the external power supply input available on the mini module should NOT be used.

When the SPC58NHADPT302S Rev. A mini module is used as a stand-alone board, 5V0 voltages must be supplied externally, 3V3 and 1V2 voltages will be generated internally by specific circuit on the mini module.

The following jumpers are used to configure the power supply (common for all supported devices):

**Table 1. Power configuration jumpers**

| Jumper     | Description                                                                                                                                                                | Default                        | Position                                                            |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------|
| <b>J1</b>  | 5.0V source for J3 pin1 (MB_5.0V_LR or 5.0V_ADC) voltage configuration:<br><ul style="list-style-type: none"> <li>1-2 MB_5.0V_LR</li> <li>2-3 5.0V_ADC</li> </ul>          | 2-3<br>(5.0V_ADC)              | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - C3 |
| <b>J2</b>  | 5V Switching voltage configuration:<br><ul style="list-style-type: none"> <li>1-2 5V EXT (External 5V supply)</li> <li>2-3 MB_5.0V_SR (5V from mother board)</li> </ul>    | 2-3<br>(MB_5.0V_SR)            | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - D4 |
| <b>J3</b>  | VDD_HV_ADR_S / VDD_HV_ADV voltage configuration:<br><ul style="list-style-type: none"> <li>1-2 5V source from J1 pin2</li> <li>2-3 3.3V_ADC source from J4 pin2</li> </ul> | 1-2<br>(5.0V_ADV)              | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - C3 |
| <b>J4</b>  | 3V3 source (3.3V and MB_3.3V_SR) voltage configuration:<br><ul style="list-style-type: none"> <li>1-2 3.3V (3.3V from Mini module)</li> <li>2-3 MB_3.3V_SR</li> </ul>      | 1-2<br>(3.3V)                  | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - D3 |
| <b>J5</b>  | Main mcu supply (VDD_HV_IO_MAIN) voltage configuration:<br><ul style="list-style-type: none"> <li>1-2 5.0V_SR (5.0V)</li> <li>2-3 3.3V_SR from J4 pin2 (3.3V)</li> </ul>   | 1-2<br>(5.0V_SR)               | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - D3 |
| <b>J6</b>  | Supply for BALLAST circuit configuration<br><ul style="list-style-type: none"> <li>1-2 VDD_HV_IO_MAIN</li> <li>2-3 5.0V_SR</li> </ul>                                      | 1-2<br>(VDD_HV_IO_MAIN)        | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - D3 |
| <b>J7</b>  | BALLAST CIRCUIT ENABLE<br><ul style="list-style-type: none"> <li>Closed: enabled</li> <li>Open: disable</li> </ul>                                                         | Closed<br>(enable)             | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - D2 |
| <b>J8</b>  | VDD_LV voltage configuration:<br><ul style="list-style-type: none"> <li>2-3 (BALLAST circuit)</li> <li>1-2 (1.2V_SR from J9 pin2)</li> </ul>                               | 1-2<br>(1.2V_SR)               | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - D3 |
| <b>J9</b>  | 1.2V_SR switching configuration:<br><ul style="list-style-type: none"> <li>1-2 MB_1.25V_SR (1.25V from MB)</li> <li>2-3 1.2V (1.2V from Mini module)</li> </ul>            | 2-3<br>(1.2V from Mini module) | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - D3 |
| <b>J16</b> | EXTREG_SEL configuration:<br><ul style="list-style-type: none"> <li>1-2 VDD_HV_IO_MAIN</li> <li>2-3 GND</li> </ul>                                                         | 1-2<br>(H level)               | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - C3 |
| <b>J27</b> | HPREG_SEL configuration:<br><ul style="list-style-type: none"> <li>1-2 VDD_HV_IO_MAIN</li> <li>2-3 GND</li> </ul>                                                          | 1-2<br>(H level)               | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B3 |

## 5.2 JTAG/LFAST LVDS interface configuration

The following jumpers need to configure the JTAG/LFAST LVDS/SIPI:

**Table 2. JTAG/LFAST/SIPI configuration jumpers**

| Jumper | Description                                                                                                 | Default         | Position                                                            |
|--------|-------------------------------------------------------------------------------------------------------------|-----------------|---------------------------------------------------------------------|
| J10    | SIPI pin 3 configuration <ul style="list-style-type: none"> <li>1-2: RDY</li> <li>2-3: PA14</li> </ul>      | 1-2<br>(RDY)    | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B3 |
| J11    | TDI_LF configuration <ul style="list-style-type: none"> <li>1-2: TDI_LF</li> <li>2-3: PA8</li> </ul>        | 1-2<br>(TDI_LF) | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - A3 |
| J12    | TDO_LF configuration <ul style="list-style-type: none"> <li>1-2: TDO_LF</li> <li>2-3: PA9</li> </ul>        | 1-2<br>(TDO_LF) | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - A3 |
| J13    | JTAG pin 13 configuration <ul style="list-style-type: none"> <li>1-2: EVTO</li> <li>2-3: PJ3/PQ4</li> </ul> | 1-2<br>(EVTO)   | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B3 |
| J14    | PC1 / ESR0 <ul style="list-style-type: none"> <li>1-2 ESR0</li> <li>2-3 PC1</li> </ul>                      | 1-2<br>(ESR0)   | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B3 |
| J15    | EVTO/ESR0 <ul style="list-style-type: none"> <li>1-2 ESR0</li> <li>2-3 EVTO</li> </ul>                      | 1-2<br>(ESR0)   | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B3 |
| J31    | EVIO/PK10 <ul style="list-style-type: none"> <li>1-2 EVTI</li> <li>2-3 PK10</li> </ul>                      | 1-2<br>(EVTI)   | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - C3 |
| J34    | CLKOUT/PE3 <ul style="list-style-type: none"> <li>1-2 PE3</li> <li>2-3 CLKOUT</li> </ul>                    | 1-2<br>(ESR0)   | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B3 |



## 5.3 System clock configuration

The mini module supports the usage of crystal clock sources as well as external clock source:

**Table 3. Clock configuration jumpers**

| Jumper     | Description                                                                                                                                                     | Default                        | Position                                                            |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------|
| <b>J20</b> | XTAL32 configuration <ul style="list-style-type: none"> <li>Close: connect pin 2 of 32.768 KHz crystal (Y2) to XTAL32</li> </ul>                                | Open                           | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - C3 |
| <b>J21</b> | EXTAL32 configuration <ul style="list-style-type: none"> <li>Close: Connect pin 1 of 32.768 KHz crystal (Y2) to EXTAL32</li> </ul>                              | Open                           | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - C3 |
| <b>J17</b> | EXTAL configuration <ul style="list-style-type: none"> <li>1-2 Connect pin 2 of 40 MHz crystal (Y1) to EXTAL</li> <li>2-3 Connect EVB-EXTAL to EXTAL</li> </ul> | 1-2<br>(Y1 pin2 to EXTAL)      | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - C2 |
| <b>J19</b> | XTAL configuration <ul style="list-style-type: none"> <li>1-2 Connect pin 1 of 40 MHz crystal (Y1) to XTAL</li> <li>2-3 Connect XTAL to GND</li> </ul>          | 1-2<br>(Y1 pin1 to XTAL)       | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - C2 |
| <b>J18</b> | Enable 8 MHz oscillator power supply <ul style="list-style-type: none"> <li>Open – Power off</li> <li>Closed – Power on</li> </ul>                              | Open<br>(Power off)            | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - C1 |
| <b>J22</b> | External 8 MHz clock source <ul style="list-style-type: none"> <li>1-2 OSC-MOD (from oscillator)</li> <li>2-3 EXTAL-SMA (from SMA connector)</li> </ul>         | 1-2<br>(8 MHz from oscillator) | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - C2 |

## 5.4 Reset circuit

The mini module supports different ways to reset the microcontroller. To use and perform the reset driving there are different jumpers and switches:

**Table 4. Reset configuration jumpers**

| Jumper     | Description                                                            | Default | Position                                                            |
|------------|------------------------------------------------------------------------|---------|---------------------------------------------------------------------|
| <b>SW1</b> | Reset push button                                                      | Open    | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - A4 |
| <b>J24</b> | Connect the external reset to the reset driver for ESR0 and PORST pins | Close   | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - A4 |
| <b>J23</b> | Connect the external reset to ESR0 pin                                 | Close   | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - A4 |
| <b>J25</b> | Connect the external reset to PORST pin                                | Close   | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - A4 |

## 5.5 Other Jumpers

**Table 5. Other jumpers**

| Jumper     | Description       | Default                       | Position                                                               |
|------------|-------------------|-------------------------------|------------------------------------------------------------------------|
| <b>J29</b> | Testmode settings | Close<br>(10 K $\Omega$ down) | Figure 8. Overview of SPC58NHADPT302S Rev. A<br>mini module - Top - B2 |

## 5.6 Configuration for pin shared between eMMC & SD Card Reader

The following jumpers need to configure the pin shared between eMMC & SD Card Reader set the jumpers described in the table below.

**Table 6. Pin shared between eMMC & SD Card Reader jumpers**

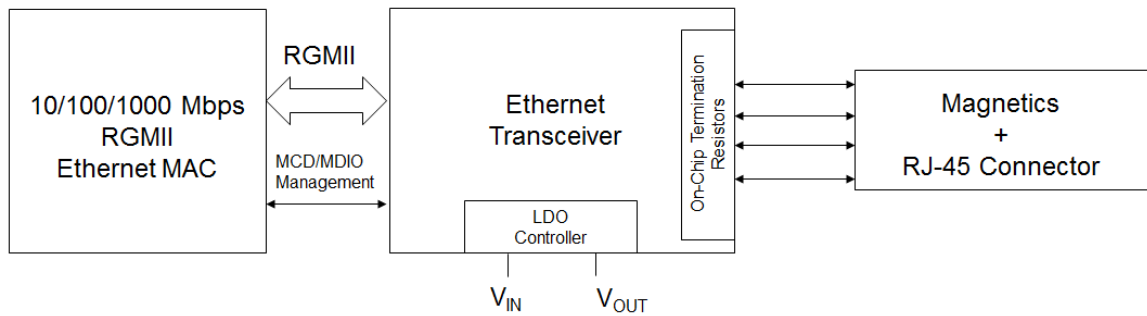
| Jumper     | Description                                                                     | Default configuration | Position                                                               |
|------------|---------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
| <b>J26</b> | Data0 – PJ3-EVTO configuration<br>• 1-2 D1_SD (SD-CARD)<br>• 2-3 D1_eMM (eMMC)  | 1-2<br>(SD-CARD)      | Figure 8. Overview of SPC58NHADPT302S Rev. A<br>mini module - Top - C2 |
| <b>J30</b> | Data1 - PJ4 configuration<br>• 1-2 D1_SD (SD-CARD)<br>• 2-3 D1_eMM (eMMC)       | 1-2<br>(SD-CARD)      | Figure 8. Overview of SPC58NHADPT302S Rev. A<br>mini module - Top - C1 |
| <b>J32</b> | Data2 - PH5 configuration<br>• 1-2 D2_SD (SD-CARD)<br>• 2-3 D2_eMM (eMMC)       | 1-2<br>(SD-CARD)      | Figure 8. Overview of SPC58NHADPT302S Rev. A<br>mini module - Top - C1 |
| <b>J35</b> | Data3 - PH6 configuration<br>• 1-2 D3_SD (SD-CARD)<br>• 2-3 D3_eMM (eMMC)       | 1-2<br>(SD-CARD)      | Figure 8. Overview of SPC58NHADPT302S Rev. A<br>mini module - Top - C1 |
| <b>J28</b> | CLK – PJ2 configuration<br>• 1-2 CLK_SD (SD-CARD)<br>• 2-3 CLK_eMM (eMMC)       | 1-2<br>(SD-CARD)      | Figure 8. Overview of SPC58NHADPT302S Rev. A<br>mini module - Top - C2 |
| <b>J33</b> | FBCLK - PJ0 configuration<br>• 1-2 FBCLK_SD (SD-CARD)<br>• 2-3 FBCLK_eMM (eMMC) | 1-2<br>(SD-CARD)      | Figure 8. Overview of SPC58NHADPT302S Rev. A<br>mini module - Top - C1 |
| <b>J36</b> | CMD - PJ1 configuration<br>• 1-2 CMD_SD (SD-CARD)<br>• 2-3 CMD_eMM (eMMC)       | 1-2<br>(SD-CARD)      | Figure 8. Overview of SPC58NHADPT302S Rev. A<br>mini module - Top - C2 |

## 6 Hardware description

### 6.1 1 Gb/s Ethernet interface

This paragraph describes the 1 Gb/s Ethernet interface present on the mini-module.  
The Ethernet connector is RJ-45 with integrated magnetics.  
The figure below shows the functional diagram of the Ethernet interface.

**Figure 3. 1 Gb/s Ethernet functional diagram**



The figure below shows the Ethernet ESD protection schema.

**Figure 4. 1 Gb/s Ethernet ESD protection schema**



The following table describes all hardware of 1 Gb/s Ethernet interface of the mini module, their position on PCB.

**Table 7. 1 Gb/s Ethernet interface**

| Jumper | Description                         | Position                                                               |
|--------|-------------------------------------|------------------------------------------------------------------------|
| U9     | ESD Protection                      | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - A3    |
| U10    | ESD Protection                      | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - A3    |
| U11    | Ethernet 1-Port GigabitEthernet PHY | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - A2/A3 |
| U19    | Ethernet connector                  | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - A3    |

## 6.2 Hyperbus interface

This paragraph describes the Hyperbus interface present on the mini module.

The SPC58NHADPT302S contains only one CS (CNS), whereas the memory device contains two CSs lines, one for RAM and one for FLASH.

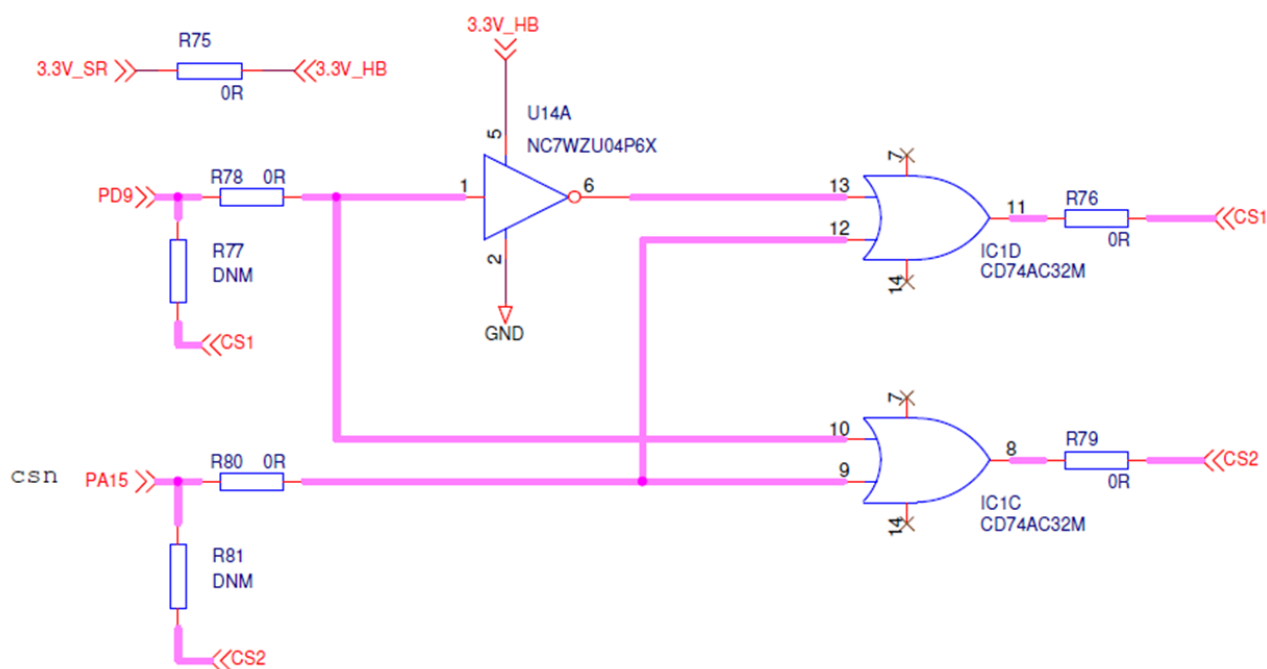
The second CS is emulated using one GPIO signal (PA[15]).

The following table shows the logic between CS/GPIO from SPC58NHADPT302S and CS0/CS1 from HyperRAM/HyperFlash device

**Table 8. Hyperbus CS truth table**

| CSN | GPIO | CS0 | CS1 |
|-----|------|-----|-----|
| 0   | 0    | 1   | 0   |
| 0   | 1    | 0   | 1   |
| 1   | 0    | 1   | 1   |
| 1   | 1    | 0   | 1   |

**Figure 5. Hyperbus CS scheme**



The following table describes all hardware HyperBus of the mini module, their position on PCB.

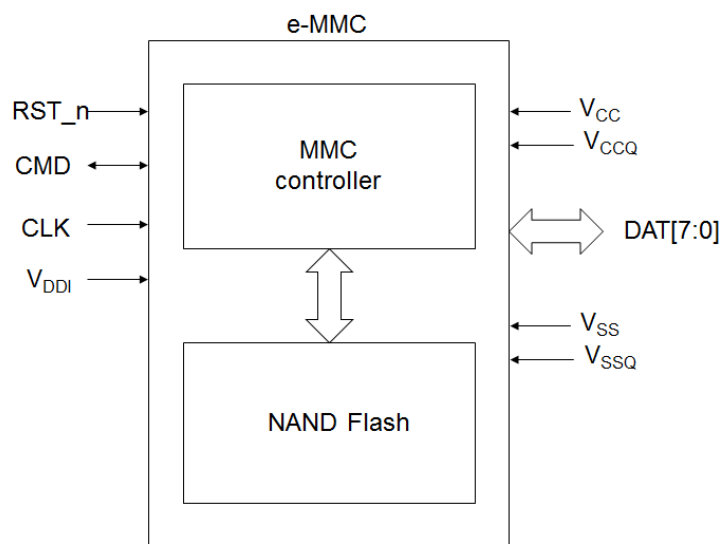
**Table 9. Hyperbus interface**

| Symbol | Description   | Position                                                               |
|--------|---------------|------------------------------------------------------------------------|
| U14    | CMOS Inverter | Figure 9. Overview of SPC58NHADPT302S Rev. A mini module - Bottom - C1 |
| IC1    | TTL OR Gate   | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B1    |
| U13    | RAM 256Mbit   | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B2    |

### 6.3 eMMC interface

This paragraph describes the embedded eMMC device present on the mini module.  
The figure below shows the functional diagram of the eMMC interface.

**Figure 6. eMMC functional diagram**



**Table 10. eMMC interface**

| Symbol     | Description      | Position                                                            |
|------------|------------------|---------------------------------------------------------------------|
| <b>U15</b> | eMMC memory 8 GB | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B1 |

## 6.4 SD/MMC interface

This paragraph describes the Card Reader JEDED/MMC standard version 5.0 compliant.

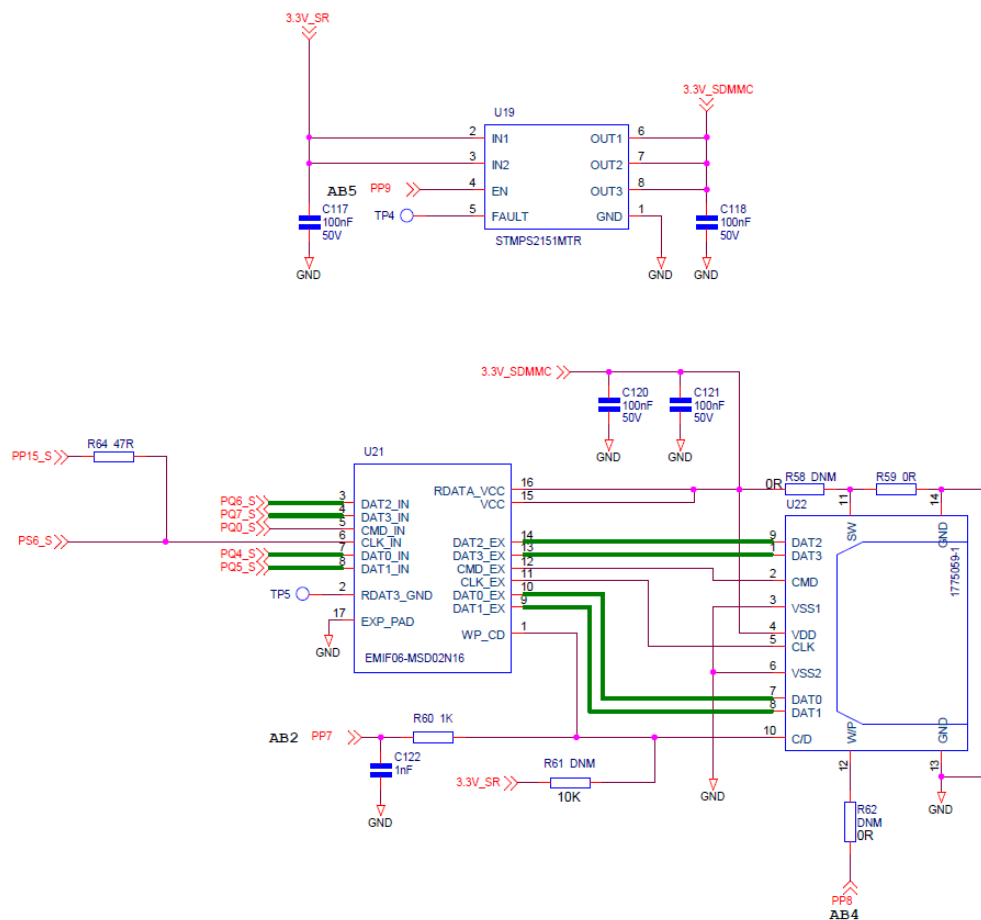
The filter used is EMIF06-MSD02N16 by STMicroelectronics.

The SD/MMC Card Reader needs to use a power switch to limit the output current to a safe level in case the output load exceeds the current limits threshold or a short is present.

Use an STMPS2151MTR by STMicroelectronics.

The figure below shows the SD/MMC Card Reader diagram.

**Figure 7. SD/MMC Card Reader diagram**



The following table describes all hardware of the SD/MMC interface of the mini module and their position on PCB.

**Table 11. SD/MMC interface**

| Symbol | Description                    | Position                                                               |
|--------|--------------------------------|------------------------------------------------------------------------|
| U16    | CMOS switch                    | Figure 9. Overview of SPC58NHADPT302S Rev. A mini module - Bottom - A2 |
| U17    | Filter EMI 6-line Micro        | Figure 9. Overview of SPC58NHADPT302S Rev. A mini module - Bottom - B2 |
| U18    | Connector SD reverse push-push | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - D1/D2 |

## 6.5 CIS, ISU and AI connectors

The mini module is fitted with three 5x2 box header connectors with 0.1". These connectors are polarized and they are placed close to the edge with a space of 5 mm between each other.

The connectors have the following features:

Connector 1 (CAN/IO/SPI): CN7 (Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B4).

Serigraphy: CIS

- Power supplies, VSS, VDD\_HV\_5v0
- 1xSPI with three CS
- 1xCAN
- 8xGPIO

**Table 12. CIS – CN7 connector pin mapping**

| Pin | Pin name          | Port   | BGA302  |
|-----|-------------------|--------|---------|
| 1   | GPIO_107/SCK_0    | PG[11] | W7      |
| 2   | VDD_HV_5v0        | -      | 5.0V_SR |
| 3   | GPIO_26/CAN1_TX   | PB[10] | Y14     |
| 4   | GPIO_52/ECAN1_RX  | PD[4]  | E20     |
| 5   | GPIO_108/SIN_0    | PG[12] | Y8      |
| 6   | GPIO_59/SOUT_0    | PD[11] | T9      |
| 7   | GPIO_109/PCS_0[0] | PG[13] | F17     |
| 8   | GPIO_95/PCS_0[1]  | PF[15] | G20     |
| 9   | GPIO_172/PCS_0[2] | PK[12] | L17     |
| 10  | VSS_HV            | -      | VSS_HV  |

Connector 2 (IO/SPI/UART): CN8 (Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - C4)

Serigraphy: ISU

- Power supplies, VSS, VDD\_HV\_5v0
- 1xSPI with three CS
- 1xUART
- 8xGPIO

**Table 13. ISU – CN8 connector pin mapping**

| Pin | Pin name          | Port   | BGA516  |
|-----|-------------------|--------|---------|
| 1   | GPIO_46/SCK_1     | PC[14] | D9      |
| 2   | VDD_HV_5v0        | -      | 5.0V_SR |
| 3   | GPIO_71/TXD_LIN1  | PE[7]  | E19     |
| 4   | GPIO_70/RXD_LIN1  | PE[6]  | E17     |
| 5   | GPIO_45/SIN_1     | PC[13] | A9      |
| 6   | GPIO_44/SOUT_1    | PC[12] | B9      |
| 7   | GPIO_126/PCS_1[0] | PH[14] | B6      |
| 8   | GPIO_83/PCS_1[1]  | PF[3]  | B5      |
| 9   | GPIO_82/PCS_1[2]  | PF[2]  | A4      |
| 10  | VSS_HV            | -      | VSS_HV  |

Connector 3 (ADC/IO): CN9 (Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - D4)

Serigraphy: AI

- Power supplies, VSS, VDD\_HV\_5v0
- 1xADC (8 signal)
- 8xGPIO

**Table 14. AI - CN9 connector pin mapping**

| Pin | Pin name      | Port   | BGA516  |
|-----|---------------|--------|---------|
| 1   | GPIO_179/AN 0 | PL[3]  | G4      |
| 2   | VDD_HV_5v0    | -      | 5.0V_SR |
| 3   | GPIO_38/AN 1  | PC[6]  | E2      |
| 4   | GPIO_37/AN 2  | PC[5]  | E1      |
| 5   | GPIO_180/AN 3 | PL[4]  | G5      |
| 6   | GPIO_181/AN 4 | PL[5]  | H5      |
| 7   | GPIO_184/AN 5 | PL[8]  | A1      |
| 8   | GPIO_176/AN 6 | PL[0]  | F5      |
| 9   | GPIO_158/AN 7 | PJ[14] | M17     |
| 10  | VSS_HV        | -      | VSS_HV  |



## 6.6 Other connectors

The mini module has the following connectors:

**Table 15. Connectors**

| Connectors      | Description                                                                    |
|-----------------|--------------------------------------------------------------------------------|
| <b>CN1</b>      | External power supplies input (5V)                                             |
| <b>CN2</b>      | 10-pin header connector for SIPI interface                                     |
| <b>CN3</b>      | 14-pin header connector for JTAG interface                                     |
| <b>CN4</b>      | 10-pin header connector for JTAG/LFAST LVDS interface                          |
| <b>CN5, CN6</b> | 2 X SAMTEC QSH series, 240 way connector to connect mini module to motherboard |
| <b>P1</b>       | SMA connector for external clock input                                         |
| <b>U18</b>      | SD revers connector                                                            |
| <b>FCCU1</b>    | FCCU test connector                                                            |

## 6.7 Test points

The mini module has several test points, described in the table below.

**Table 16. Test points**

| Test point  | Description          | Position                                                            |
|-------------|----------------------|---------------------------------------------------------------------|
| <b>TP0</b>  | VDD_HV_IO_MAIN       | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - D2 |
| <b>TP1</b>  | VSS_OSC              | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - C2 |
| <b>TP2</b>  | AGND                 | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - C3 |
| <b>TP3</b>  | JCOMP_RxDATA_N/PA[5] | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - A2 |
| <b>TP4</b>  | TCK/PA[6]            | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - A1 |
| <b>TP5</b>  | TMS_TxDATA_P/PA[7]   | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - A2 |
| <b>TP6</b>  | TXD0                 | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B3 |
| <b>TP7</b>  | TXD1                 | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B3 |
| <b>TP8</b>  | TXD2                 | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B2 |
| <b>TP9</b>  | TXD3                 | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B2 |
| <b>TP10</b> | GTX_CLK              | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B2 |
| <b>TP11</b> | INT_N (on U11)       | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - A2 |
| <b>TP12</b> | MDC                  | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B2 |
| <b>TP13</b> | MDIO                 | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B2 |
| <b>TP14</b> | CK_HB                | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B2 |
| <b>TP15</b> | D0_HB                | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - C2 |
| <b>TP16</b> | D1_HB                | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B2 |
| <b>TP17</b> | D2_HB                | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B2 |
| <b>TP18</b> | D3_HB                | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B2 |
| <b>TP19</b> | D4_HB                | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B2 |
| <b>TP20</b> | D5_HB                | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B2 |
| <b>TP21</b> | D6_HB                | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B2 |

| Test point  | Description        | Position                                                            |
|-------------|--------------------|---------------------------------------------------------------------|
| <b>TP22</b> | D7_HB              | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B2 |
| <b>TP23</b> | RWDS_HB            | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B2 |
| <b>TP24</b> | CMD_eMM            | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - B2 |
| <b>TP25</b> | FAULT (on U16)     | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - C2 |
| <b>TP26</b> | RDAT3_GND (on U17) | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - C2 |
| <b>TP27</b> | 1.2V_ETH           | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - A2 |
| <b>TP28</b> | GND                | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - A4 |
| <b>TP29</b> | GND                | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - A1 |
| <b>TP30</b> | GND                | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - D1 |
| <b>TP31</b> | GND                | Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top - D4 |

## 7 Layout overview

Figure 8. Overview of SPC58NHADPT302S Rev. A mini module - Top

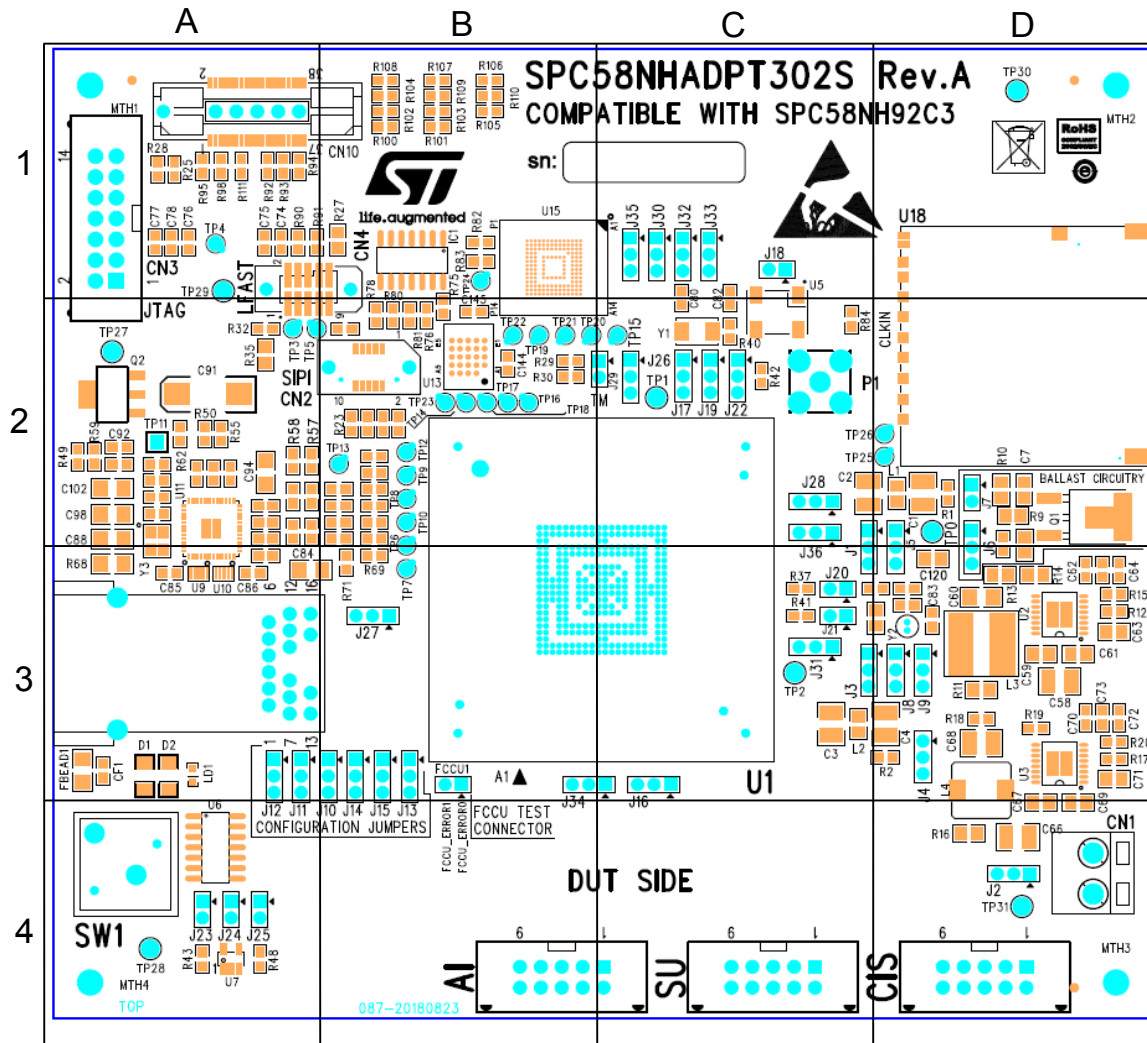
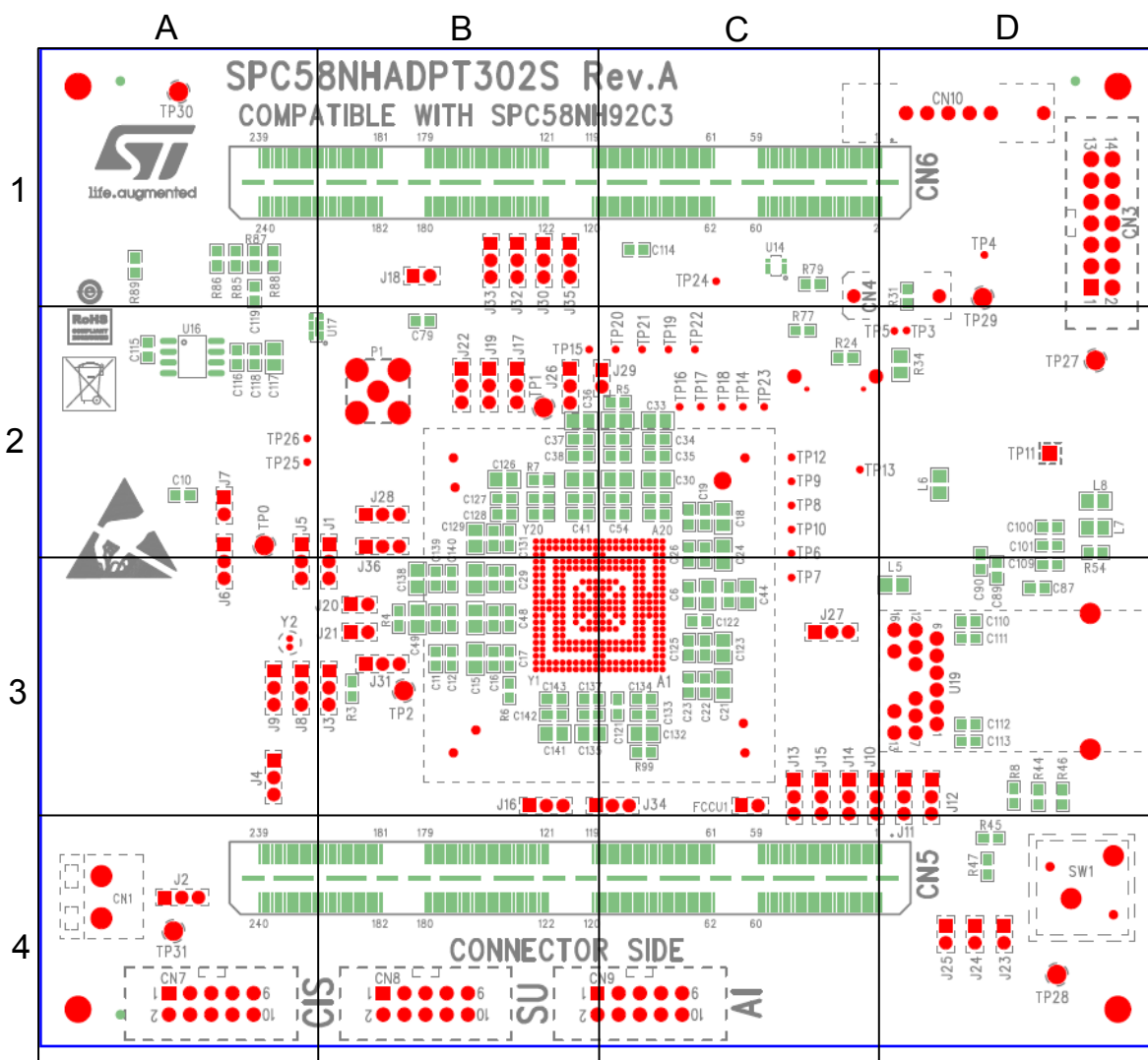


Figure 9. Overview of SPC58NHADPT302S Rev. A mini module - Bottom



## 8 BOM

**Table 17. BOM**

| Itm | Qty | Ref. designator                                                                                                                                                                                                                                                                  | Value                       | Description                                  | Manufacturer     | Manufcode               |
|-----|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------------------------------------------|------------------|-------------------------|
| 1   | 42  | C11, C16, C19,<br>C22, C25, C42,<br>C47, C50, C53,<br>C56, C79, C85,<br>C86, C87, C89,<br>C90, C92, C95,<br>C96, C97, C99,<br>C103, C104,<br>C105, C106,<br>C107, C108,<br>C110, C111,<br>C112, C113,<br>C114, C115,<br>C116, C118,<br>C121, C122,<br>C124, C127,<br>C130, C133  | 100 nF                      | Mult. cer. cap.                              | Murata           | GCM188R71H104KA57D      |
| 1   | 42  | C11, C16,C19,<br>C22, C25, C42,<br>C47, C50, C53,<br>C56, C79, C85,<br>C86, C87, C89,<br>C90, C92, C95,<br>C96, C97, C99,<br>C103,C104,<br>C105, C106,<br>C107, C108,<br>C110, C111,<br>C112, C113, C114<br><br>C115, C116,<br>C118, C121,<br>C122, C124,<br>C127, C130,<br>C133 | 100 nF                      | Mult. cer. cap.                              | Murata           | GCM188R71H104KA57D      |
| 2   | 1   | CN1, CF1                                                                                                                                                                                                                                                                         | 2V1P                        | Screw terminal<br>block, 1 row (N4)          |                  |                         |
| 3   | 1   | CN2                                                                                                                                                                                                                                                                              | ERF8-005-05.0-L-DV-L-<br>TR | Conn rugged<br>female 10 pin, HS<br>(N6)     | Samtec           | ERF8-005-05.0-L-DV-L-TR |
| 4   | 1   | CN3                                                                                                                                                                                                                                                                              | N2514-6002RB                | Conn flat male 14<br>pin, 180°               | 3M               | N2514-6002RB            |
| 5   | 1   | CN4                                                                                                                                                                                                                                                                              | Samtec<br>TFM-105-02-L-D-WT | Conn TFM 10 pin,<br>with weld Tabs<br>(N6)   | Samtec           | TFM-105-02-L-D-WT       |
| 6   | 2   | CN5, CN6                                                                                                                                                                                                                                                                         | Samtec<br>QSH-120-01-L-D-A  | Female conn 240<br>pin, 2 Row                | Samtec           | QSH-120-01-L-D-A        |
| 7   | 3   | CN7, CN8, CN9                                                                                                                                                                                                                                                                    | N2510-6002-RB               | Conn flat male 10<br>pin, 180° (N7)          | 3M               | N2510-6002-RB           |
| 8   | 1   | CN10                                                                                                                                                                                                                                                                             | 5767054-1                   | Conn female 38<br>pin, 180°, MICTOR<br>- GND | Tyco Electronics | 5767054-1               |
| 9   | 4   | C1, C2, C3, C4                                                                                                                                                                                                                                                                   | 4.7 uF                      | Mult. cer. cap.                              | Murata           | GRM32ER71H475KA88L      |
| 10  | 3   | C5, C44, C117                                                                                                                                                                                                                                                                    | 1 uF                        | Mult. cer. cap.                              | Murata           | GRM21BR71H105KA12L      |

| Itm | Qty | Ref. designator                                                                                                                                                                                                                                                                  | Value  | Description                   | Manufacturer | Manufcode          |
|-----|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------------|--------------|--------------------|
| 11  | 26  | C6, C12, C17, C20, C23, C26, C29, C32, C35, C38, C41, C43, C45, C48, C51, C54, C57, C93, C100, C125, C128, C131, C134, C137, C140, C143, C6, C12, C17, C20, C23, C26, C29, C32, C35, C38, C41, C43, C45, C48, C51, C54, C57, C93, C100, C125, C128, C131, C134, C137, C140, C143 | 10 nF  | Mult. cer. cap.               | Murata       | GCM188R71H103KA37D |
| 12  | 12  | C7, C8, C15, C27, C30, C33, C36, C39, C120, C135, C138, C141                                                                                                                                                                                                                     | 2.2 uF | Mult. cer. cap.               | Murata       | GCM21BR71C225KA64L |
| 13  | 6   | C9, C10, C74, C75, C76, C77                                                                                                                                                                                                                                                      | DNM    | Mult. cer. cap. - not mounted |              |                    |
| 14  | 11  | C18, C21, C24, C46, C49, C52, C55, C123, C126, C129, C132                                                                                                                                                                                                                        | 4.7 uF | Mult. cer. cap.               | Murata       | GCM21BR71C475KA73  |
| 15  | 8   | C28, C31, C34, C37, C40, C136, C139, C142                                                                                                                                                                                                                                        | 47 nF  | Mult. cer. cap.               | Murata       | GCM188R71H473KA55D |
| 16  | 1   | C58                                                                                                                                                                                                                                                                              | 22 uF  | Mult. cer. cap.               | Murata       | GRM32ER71E226KE15L |
| 17  | 4   | C59, C61, C67, C69                                                                                                                                                                                                                                                               | 470 nF | Mult. cer. cap.               | Murata       | GRM21BR71H474KA88L |
| 18  | 6   | C60, C84, C88, C94, C98, C102                                                                                                                                                                                                                                                    | 47 uF  | Mult. cer. cap.               | KEMET        | C1206C476M8PACTU   |
| 19  | 2   | C62, C70                                                                                                                                                                                                                                                                         | 8.2 nF | Mult. cer. cap.               | Phycomp      | 2238 586 15635     |
| 20  | 2   | C63, C71                                                                                                                                                                                                                                                                         | 68 nF  | Mult. cer. cap.               | Multicomp    | MCCA000383         |
| 21  | 1   | C64                                                                                                                                                                                                                                                                              | 390 pF | Mult. cer. cap.               | Murata       | GRM1885C1H391JA01  |
| 22  | 3   | C65, C101, C109                                                                                                                                                                                                                                                                  | 22 pF  | Mult. cer. cap.               | AVX          | 06035A220JAT2A     |
| 23  | 2   | C66, C68                                                                                                                                                                                                                                                                         | 15 uF  | Mult. cer. cap.               | TDK          | C3225X7R1C156M     |
| 24  | 1   | C72                                                                                                                                                                                                                                                                              | 470 pF | Mult. cer. cap.               | AVX          | 06035A471JAT2A     |
| 25  | 2   | C73, C78                                                                                                                                                                                                                                                                         | 27 pF  | Mult. cer. cap.               | KEMET        | C0603C270J5GAC     |
| 26  | 2   | C80, C82                                                                                                                                                                                                                                                                         | 8 pF   | Mult. cer. cap.               | KEMET        | CBR06C809B5GAC     |
| 27  | 2   | C81, C83                                                                                                                                                                                                                                                                         | 10 pF  | Mult. cer. cap.               | AVX          | 06035A100JAT2A     |
| 28  | 1   | C91                                                                                                                                                                                                                                                                              | 47 uF  | Tantalum cap.                 | KEMET        | T491D476K016AS     |
| 29  | 1   | C119                                                                                                                                                                                                                                                                             | 1 nF   | Mult. cer. cap.               | Murata       | GCM188R72A102KA37D |
| 30  | 2   | C144, C145                                                                                                                                                                                                                                                                       | 1 uF   | Mult. cer. cap.               | Vishay       | VJ0603Y104KXJ      |
| 31  | 1   | D1                                                                                                                                                                                                                                                                               | Yellow | Led diode yellow              | Agilent      | HSMY-C150          |
| 32  | 1   | D2                                                                                                                                                                                                                                                                               | Red    | Led diode red                 | Agilent      | HSMS-C150          |

| Itm | Qty | Ref. designator                                                                                                                                                                                                                 | Value           | Description                                      | Manufacturer                    | Manufcode          |
|-----|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------------------------------------------|---------------------------------|--------------------|
| 33  | 1   | FBEAD1                                                                                                                                                                                                                          | 100R            | Multilayer ferrite                               | Laird-Signal Integrity Products | HI1206N101R-10     |
| 34  | 4   | FCCU1, J18, J20, J21                                                                                                                                                                                                            | STRIP2PMD-2MM-O | Strip male 2 pin, 1 row, 180°<br>(see mech part) | Harwin                          | M22-2512005        |
| 35  | 1   | IC1                                                                                                                                                                                                                             | CD74AC32M       | TTL OR gate                                      | Texas Instruments               | CD74AC32M          |
| 36  | 28  | J1, J2, J3, J4, J5, J6, J8, J9, J10, J11, J12, J13, J14, J15, J16, J17, J19, J22, J26, J27, J28, J30, J31, J32, J33, J34, J35, J36                                                                                              | STRIP3PMD-2MM   | Strip male 3 pin, 1 row, 180°<br>(see mech part) | Harwin                          | M22-2512005        |
| 37  | 5   | J7, J23, J24, J25, J29                                                                                                                                                                                                          | STRIP2PMD-2MM   | Strip male 2 pin, 1 row, 180°<br>(see mech part) | Harwin                          | M22-2512005        |
| 38  | 1   | LD1                                                                                                                                                                                                                             | Green           | Led diode green                                  | Kingbright                      |                    |
| 39  | 2   | L1, L2                                                                                                                                                                                                                          | 220R            | Multilayer ferrite bead                          | TDK                             | MPZ2012S221A       |
| 40  | 1   | L3                                                                                                                                                                                                                              | 3.9 uH          | Inductor                                         | Würth Elektronik                | 744787039          |
| 41  | 1   | L4                                                                                                                                                                                                                              | 4.7 uH          | Inductor                                         | TDK Corporation                 | CLF7045T-4R7N-D    |
| 42  | 4   | L5, L6, L7, L8                                                                                                                                                                                                                  | 220R            | Multilayer ferrite                               | Murata                          | BLM21PG221SN1D     |
| 43  | 1   | P1                                                                                                                                                                                                                              | SMA-FEM-180     | Coax conn female 5 pin, 180°                     | Samtec                          | SMA-J-P-H-ST-TH1   |
| 44  | 1   | Q1                                                                                                                                                                                                                              | NJD2873T4G      | Trans. NPN plastic power                         | ON Semiconductor                | NJD2873T4G         |
| 45  | 1   | Q2                                                                                                                                                                                                                              | FDT434P         | Trans. mos P-ch                                  | ON Semiconductor                | FDT434P            |
| 46  | 44  | R1, R2, R3, R4, R5, R6, R7, R12, R17, R32, R33, R36, R38, R40, R54, R59, R62, R75, R76, R78, R79, R80, R82, R83, R84, R86, R90, R91, R92, R95, R98, R99, R100, R101, R102, R103, R104, R105, R106, R107, R108, R109, R110, R111 | 0R              | Resistor                                         | Neohm                           |                    |
| 47  | 3   | R8, R73, R74                                                                                                                                                                                                                    | 180R            | Resistor                                         |                                 |                    |
| 48  | 1   | R9                                                                                                                                                                                                                              | 0R              | Resistor                                         | Vishay Dale                     | CRCW08050000Z0EAHP |
| 49  | 5   | R10, R27, R34, R35, R39                                                                                                                                                                                                         | DNM             | Resistor - not mounted                           |                                 |                    |
| 50  | 2   | R11, R16                                                                                                                                                                                                                        | 1M              | Resistor                                         | MultiComp                       |                    |
| 51  | 1   | R13                                                                                                                                                                                                                             | 180K            | Resistor                                         | MultiComp                       |                    |
| 52  | 1   | R14                                                                                                                                                                                                                             | 430K            | Resistor                                         | MultiComp                       |                    |

| Itm | Qty | Ref. designator                                                                                                                                              | Value        | Description                          | Manufacturer       | Manufcode           |
|-----|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------------------------------|--------------------|---------------------|
| 53  | 1   | R15                                                                                                                                                          | 51K          | Resistor                             |                    |                     |
| 54  | 1   | R18                                                                                                                                                          | 249K         | Resistor                             | Vishay             | CRCW0603249RFKEA    |
| 55  | 1   | R19                                                                                                                                                          | 86K6         | Resistor                             |                    |                     |
| 56  | 1   | R20                                                                                                                                                          | 43K          | Resistor                             | Vishay             | CRCW060343K0FKEA    |
| 57  | 24  | R21, R22, R23,<br>R24, R25, R26,<br>R29, R31, R37,<br>R41, R49, R51,<br>R55, R57, R58,<br>R66, R67, R71,<br>R72, R77, R81,<br>R85, R88, R89                  | DNM          | Resistor - not mounted               |                    |                     |
| 58  | 13  | R28, R30, R45,<br>R50, R52, R53,<br>R60, R61, R65,<br>R69, R70, R93,<br>R94                                                                                  | 10K          | Resistor                             | Mini-Reel          | CR1J10KF-MR         |
| 59  | 1   | R42                                                                                                                                                          | 50R          | Resistor                             |                    |                     |
| 60  | 5   | R43, R47, R48,<br>R63, R64                                                                                                                                   | 4K7          | Resistor                             | Neohm              |                     |
| 61  | 2   | R44, R46                                                                                                                                                     | 560R         | Resistor                             | Vishay             | CRCW0603560RFKEA    |
| 62  | 2   | R56, R87                                                                                                                                                     | 1K           | Resistor                             |                    |                     |
| 63  | 1   | R68                                                                                                                                                          | 12K1         | Resistor                             |                    | FCR0FT-1212         |
| 64  | 1   | SW1                                                                                                                                                          | Pushbutton   | Pushbutton NO B6110-0 (N3)           | Delta Elettronica  | B6110-0             |
| 65  | 8   | TP1, TP2, TP27,<br>TP28, TP29,<br>TP30, TP31, TP0                                                                                                            | TESTPOINT    | PCB Test point 1 pin - black         |                    |                     |
| 66  | 23  | TP3, TP4, TP5,<br>TP6, TP7, TP8,<br>TP9, TP10, TP12,<br>TP13, TP14,<br>TP15, TP16,<br>TP17, TP18,<br>TP19, TP20,<br>TP21, TP22,<br>TP23, TP24,<br>TP25, TP26 | TP SMD       | Test point - ignore                  |                    |                     |
| 67  | 1   | TP11                                                                                                                                                         | TP-STRIP     | Test point - ignore                  |                    |                     |
| 68  | 1   | U1                                                                                                                                                           | FPBGA302     | Socket Yamaichi NP351-302-772 (N5)   | Yamaichi           | NP351-302-774       |
| 69  | 2   | U2, U3                                                                                                                                                       | A6986        | Volt. reg                            | STMicroelectronics | A6986               |
| 70  | 1   | U5                                                                                                                                                           | 8MHz         | Clock oscillator                     | ECS                | ECS-3953M-080-BN-TR |
| 71  | 1   | U6                                                                                                                                                           | 74LVC125AMTR | HCMOS buffer                         | STMicroelectronics | 74LVC125AMTR        |
| 72  | 1   | U7                                                                                                                                                           | 74V1G08STR   | CMOS AND gate                        | STMicroelectronics | 74V1G08STR          |
| 73  | 2   | U9, U10                                                                                                                                                      | HSP061-4M10Y | ESD protection                       | STMicroelectronics | HSP061-4M10Y        |
| 74  | 1   | U11                                                                                                                                                          | KSZ9031RNXIA | Ethernet 1-port Gigabit Ethernet PHY | STMicroelectronics | KSZ9031RNXIA        |



| Itm | Qty | Ref. designator                                                                                                                                                                  | Value             | Description                                    | Manufacturer            | Manufcode                              |
|-----|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------------------------------|-------------------------|----------------------------------------|
| 75  | 1   | U13                                                                                                                                                                              | S71KL256SC0BHB000 | RAM 256Mbit                                    | Cypress                 | S71KL256SC0BHB000                      |
| 76  | 1   | U14                                                                                                                                                                              | NC7WZU04P6X       | CMOS inverter                                  | ON Semiconductor        | NC7WZU04P6X                            |
| 77  | 1   | U15                                                                                                                                                                              | IS21ES08G-JCLI    | eMMC memory 8 GB 3.3 V 200 Mhz eMMC NAND flash | ISSI                    | IS21ES08G-JCLI                         |
| 78  | 1   | U16                                                                                                                                                                              | STMPS2151MTR      | CMOS switch                                    | STMicroelectronics      | STMPS2151MTR                           |
| 79  | 1   | U17                                                                                                                                                                              | EMIF06-MSD02N16   | Filter EMI 6-line micro                        | STMicroelectronics      | EMIF06-MSD02N16                        |
| 80  | 1   | U18                                                                                                                                                                              | 1775059-1         | Connector SD reverse push-push                 | TE Connectivity         | 1775059-1                              |
| 81  | 1   | U19                                                                                                                                                                              | JK0-0136NL        | Ethernet connector                             | Pulse Electronic        | JK0-0136NL                             |
| 82  | 1   | Y1                                                                                                                                                                               | 40 MHz            | Quartz                                         | NDK                     | NX5032GA                               |
| 83  | 1   | Y2                                                                                                                                                                               | 32.768 KHz        | Quartz                                         | Citizen Finitech Miyota | CFS206-32.768-KDZF-UB                  |
| 84  | 1   | Y3                                                                                                                                                                               | 25 MHZ            | Quartz                                         | Epson                   | X1E0000210132<br>TSX-3225 25 MHZ 9.0PF |
| 85  | 1   | PCB                                                                                                                                                                              |                   | PCB FR4 1.6 mm;<br>127 mm X 114,3 mm 12Layers  |                         |                                        |
| 86  | 8   | FCCU1, J18, J20, J21, J1, J2, J3, J4, J5, J6, J8, J9, J10, J11, J12, J13, J14, J15, J16, J17, J19, J22, J26, J27, J28, J30, J31, J32, J33, J34, J35, J36, J7, J23, J24, J25, J29 | STRIP20PMD-2MM    | Strip male 20 pin, 1 row, 180° (N1)            | Harwin                  | M22-2512005                            |
| 87  | 37  | FCCU1, J18, J20, J21J1, J2, J3, J4, J5, J6, J8, J9, J10, J11, J12, J13, J14, J15, J16, J17, J19, J22, J26, J27, J28, J30, J31, J32, J33, J34, J35, J36, J7, J23, J24, J25, J29   |                   | Bridge shunt 2 pins female 2mm black (N2)      | TOPTEK                  | MJ2P-CGB-L                             |



### Figure 10. uC supply

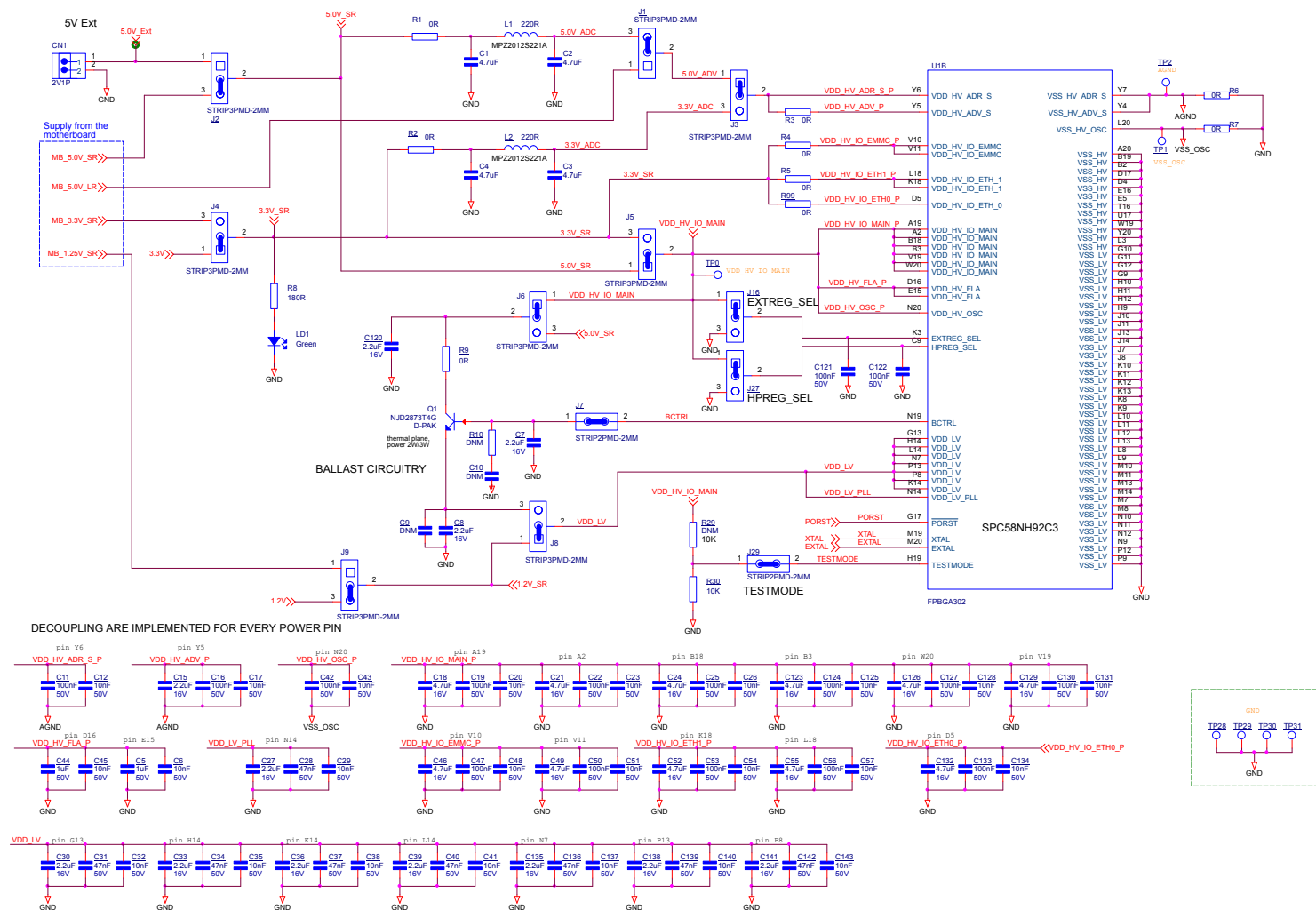


Figure 11. Voltage regulators

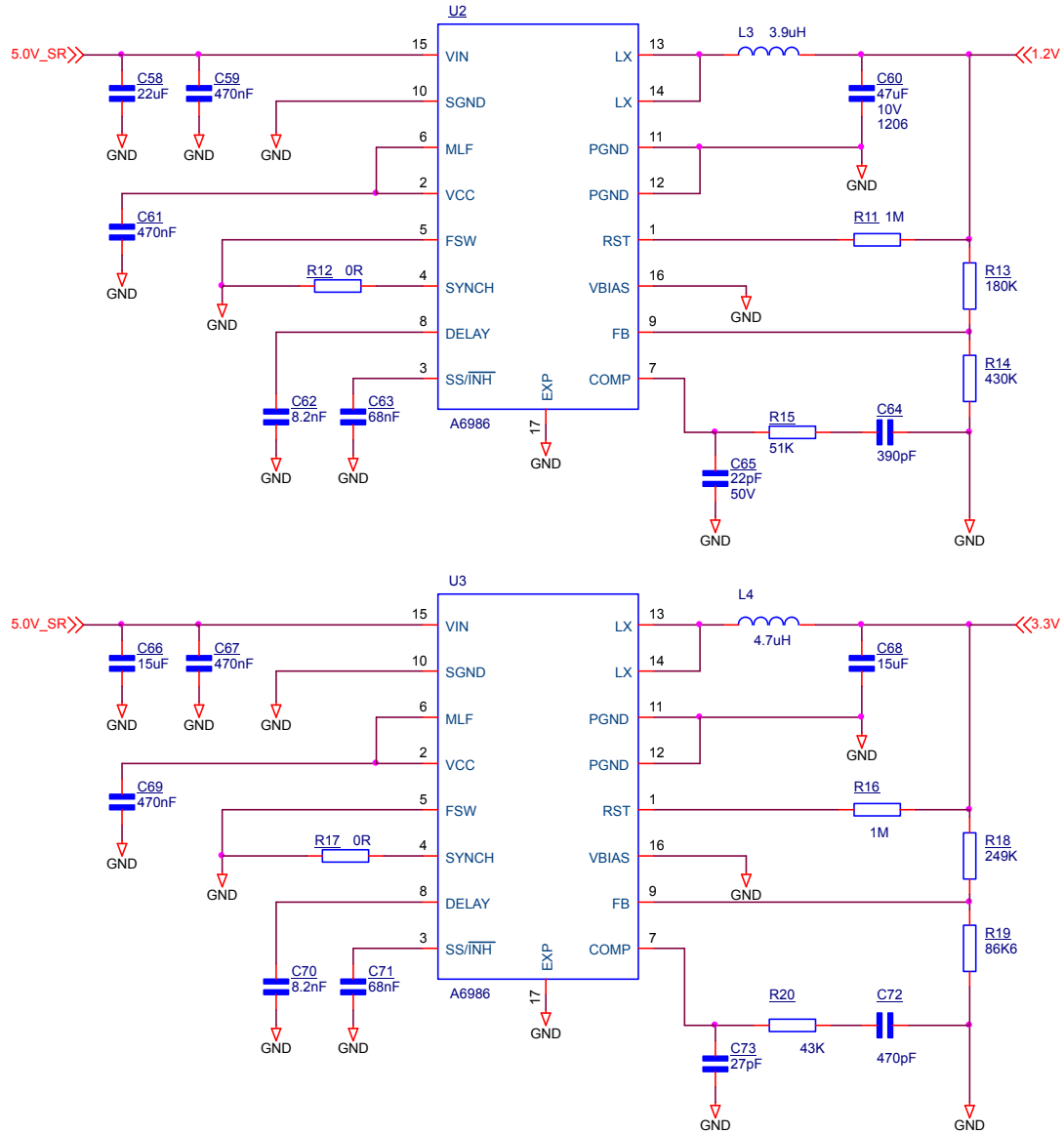
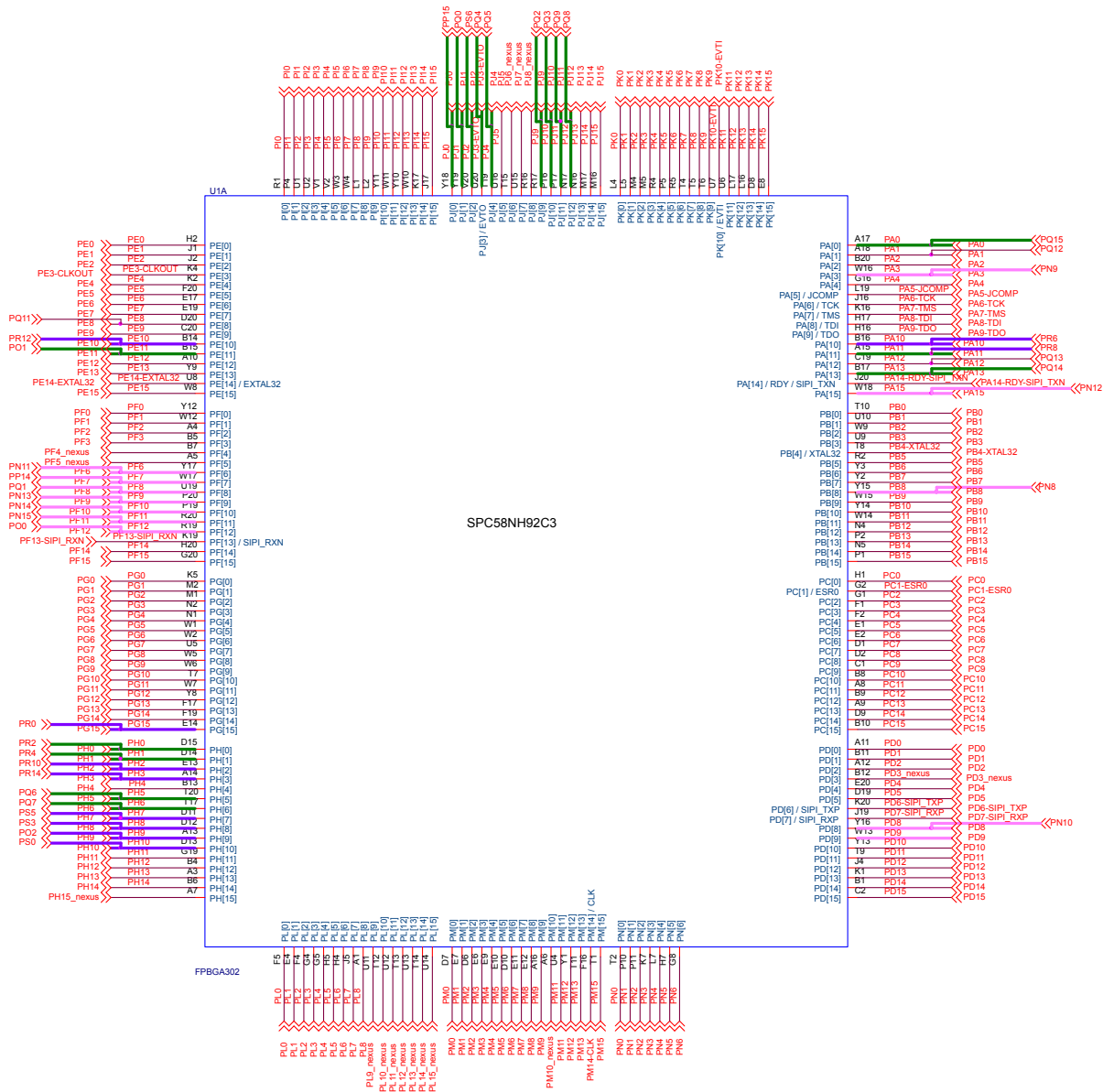


Figure 12. uC I/O



## LEGEND

- NORMAL TRACE
- 50  $\Omega$  TRACE
- 50  $\Omega$  SAME LENGHT TRACE
- 50  $\Omega$  SAME LENGHT TRACE with toll



### Figure 13. Debug connectors

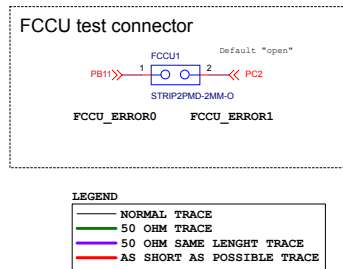
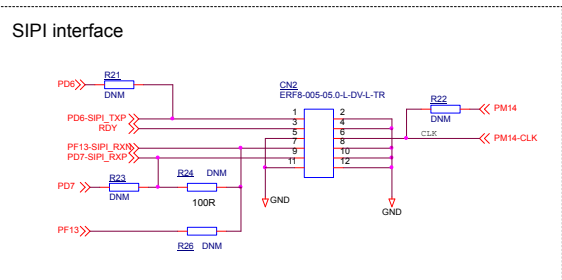
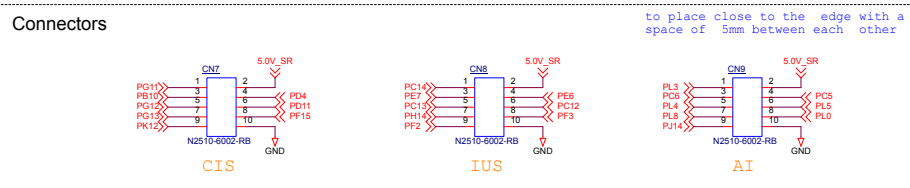
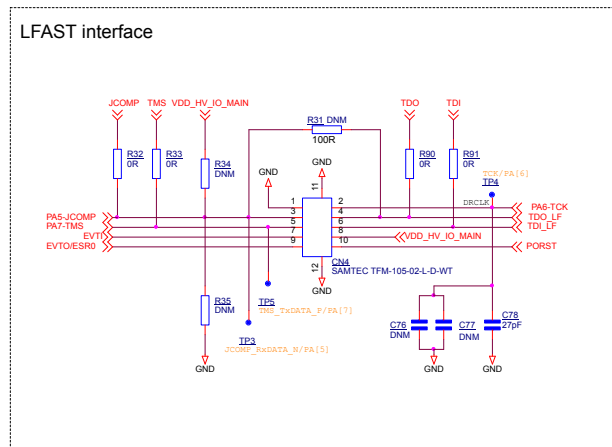
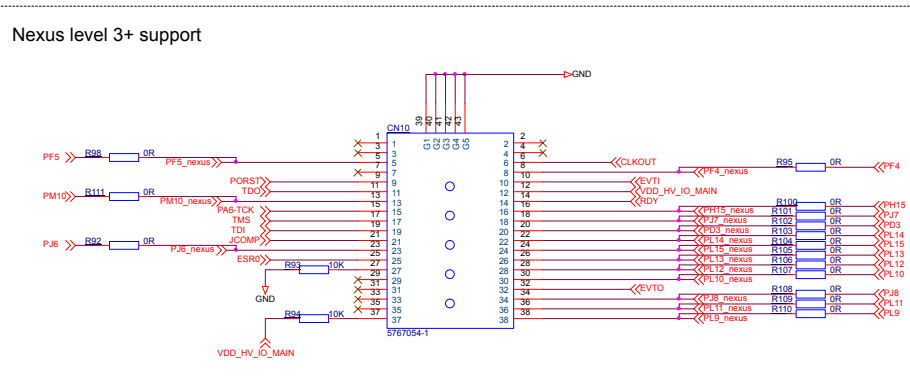
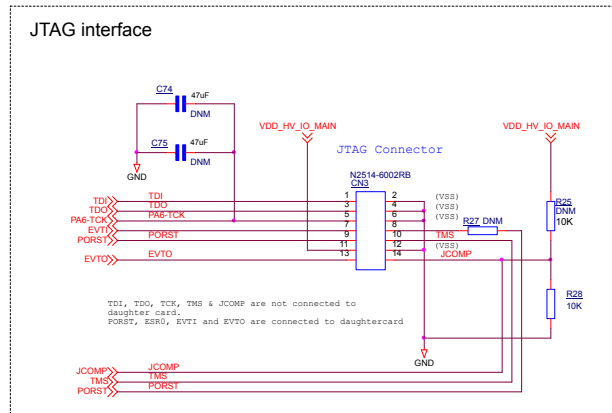
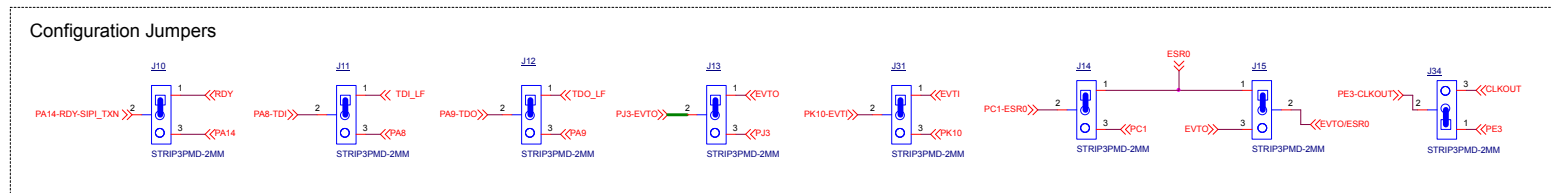


Figure 14. Clock and reset

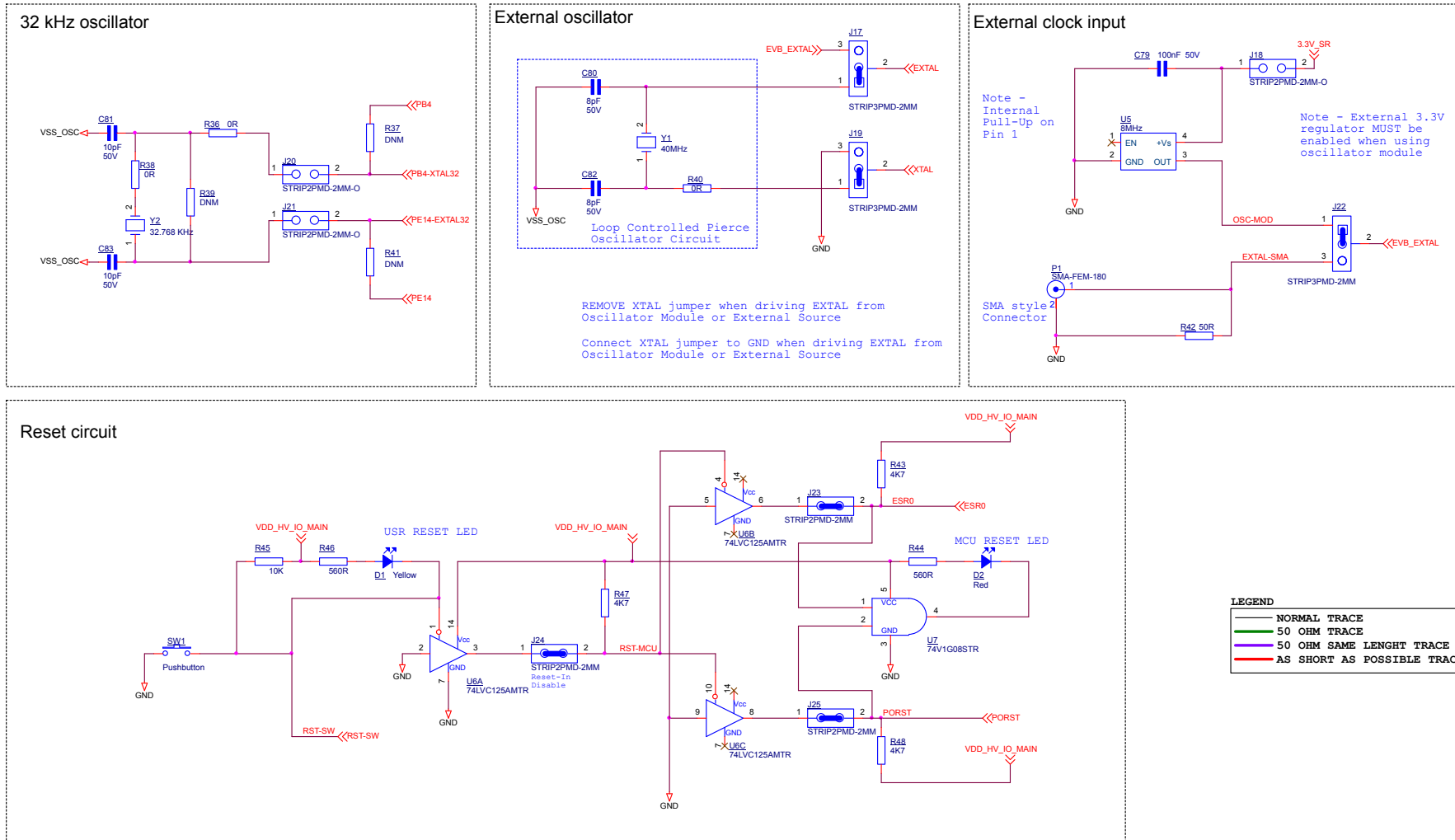
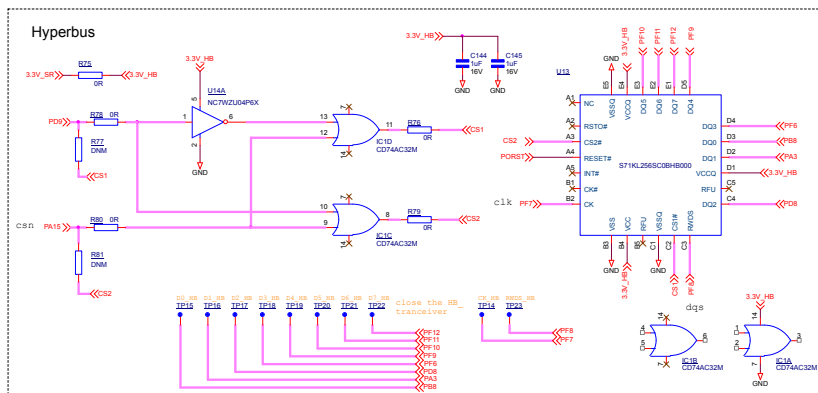
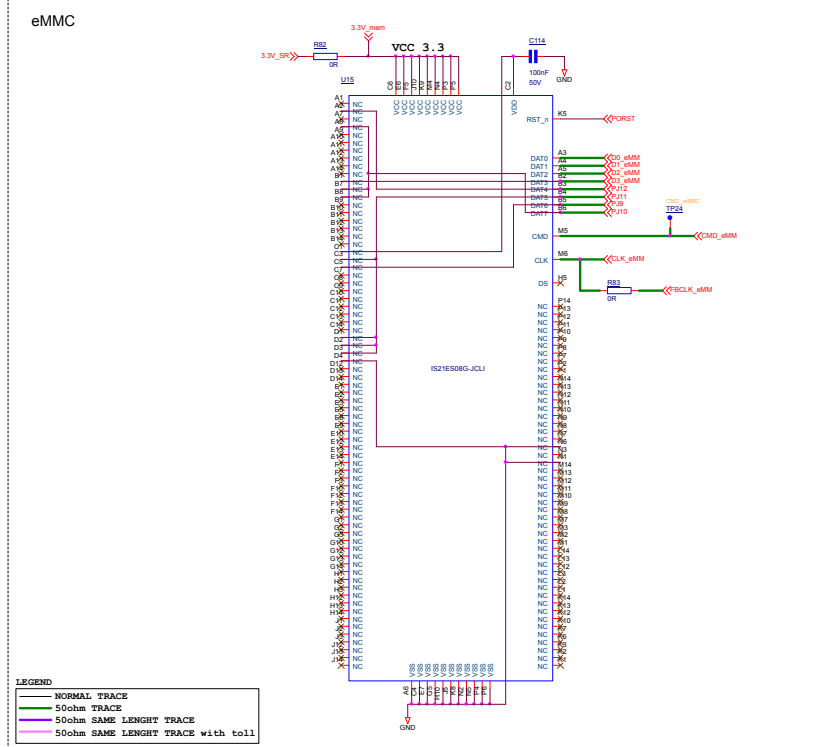
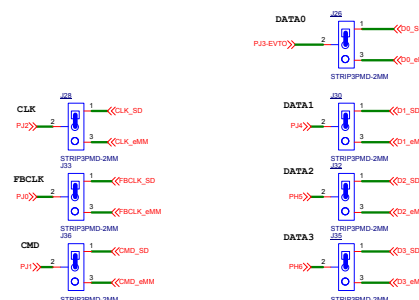




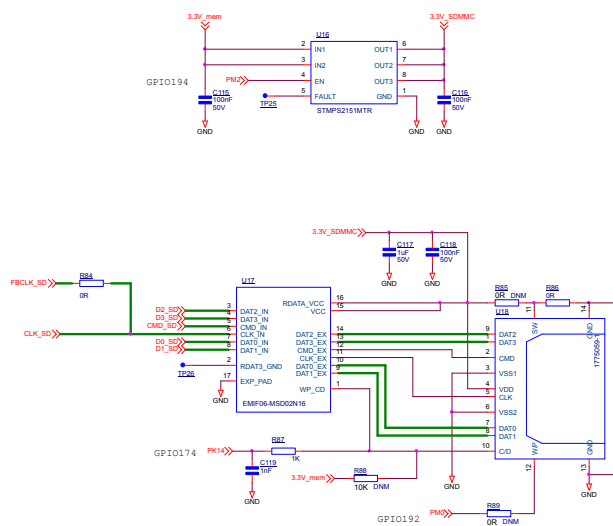
Figure 16. Hyperbus, eMMC and SD card reader



PIN shared between eMMC & SD Card Reader

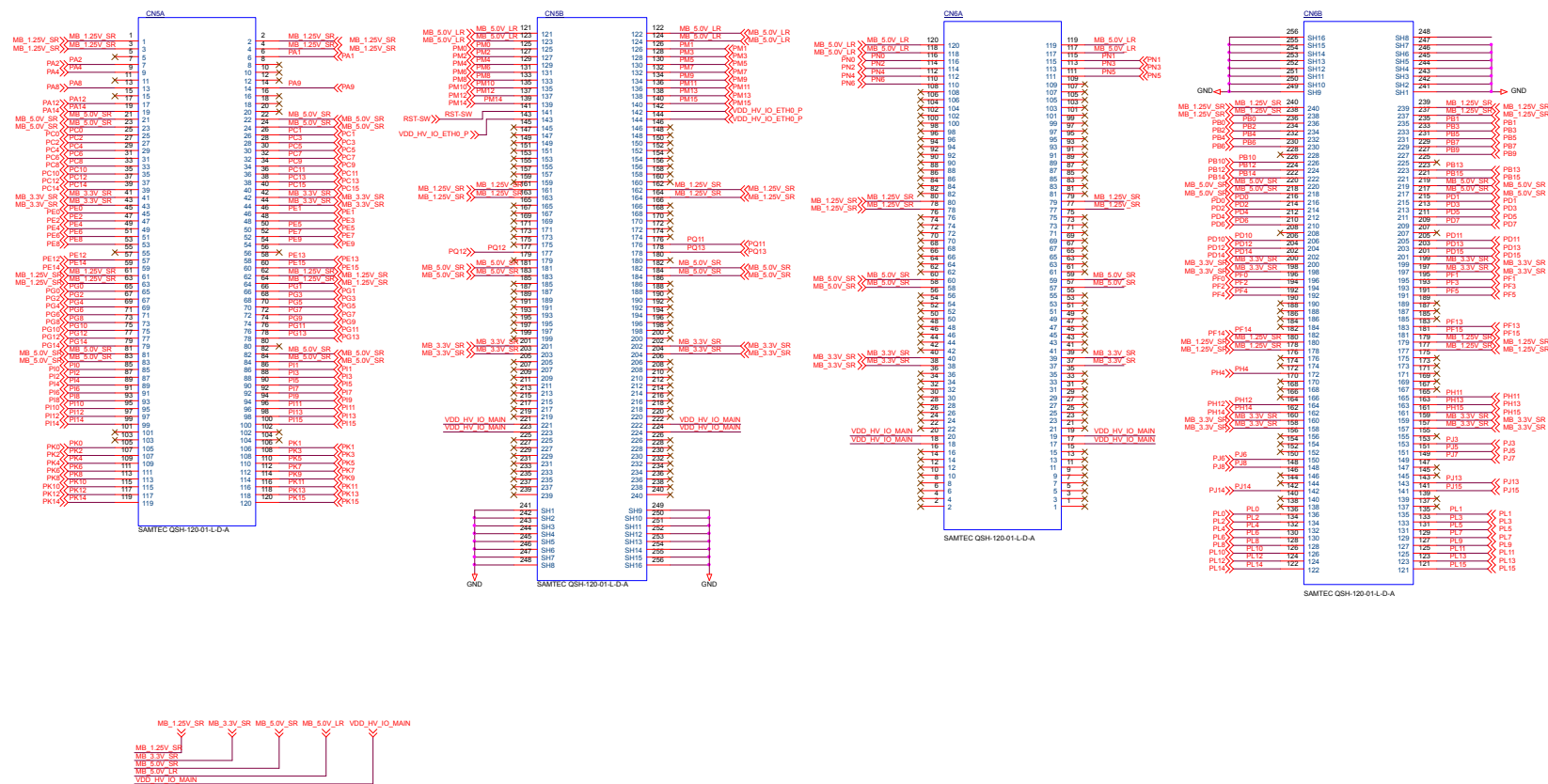


SD Card Reader





### Figure 17. Motherboard connectors



## Revision history

**Table 18. Document revision history**

| Date        | Version | Changes          |
|-------------|---------|------------------|
| 03-Jun-2020 | 1       | Initial release. |

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